



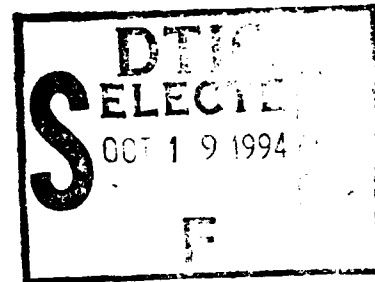
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IMPLEMENTATION OF THE MILITARY HANDBOOK 17
FOR POLYMER MATRIX COMPOSITES AND
METAL MATRIX COMPOSITES

July 1 - 31, 1994

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Contract No. DAAL01-93-C-4064

Technical Progress Report

MSC TPR 3456/CA07

October, 1994

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U.S. Army Research Laboratory - Watertown, MA

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Date of Determination: 9/14/93. Other requests should be referred to U.S. Army Research Laboratory,
Attn: AMSRL-MA-S (Mr. Edward Clegg), 405 Arsenal Street, Watertown, MA 02172-0001.

Submitted By:

Crystal H. Newton
Principal Investigator

Crystal H. Newton
94

Prepared For:

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1. MILESTONE PROGRESS

Based on the requirements of Contract Modification 0003, preparation of input to handbook from the 27th (Portland), 28th (Alexandria), and 29th (Monterey) meetings has been planned. All figures in the revisions and new sections will be scanned and included as part of the WordPerfect files. Corrections to Volume 1, Chapter 7 have been received from the Structural Joints working group. These corrections will be implemented in the next change notice or revision.

The following draft sections from the 29th meeting in Monterey have been approved:

Volume 1

- 1.4.1 Toxicity, Health Hazards, and Safety
- 1.7 Definitions - new and revised definitions
- 6.6.1 General [Lamina, Laminate, and Fabric Mechanical Property Tests] - revision
- 8.4.2 Organization of data in handbook - revision

Volume 3

- 2.2.1.6 Polyimides - new
- 2.2.2.2 Amorphous Thermoplastics - new material to be appended
- 4.4 Laminate Strength and Failure - revision
- 4.7.2 Compression postbuckling and crippling - replaces Section 4.7.1.8
- Chapter 7 Revised outline

Comments were made on three braiding definitions which will be forwarded to the Braiding/Filament Winding working group for review.

Data analysis has progressed on the AS4/3502 tape and 5-harness satin modulus data. Data sets are being considered in the priority order established following the Spring meeting. Data have been analyzed to address data pooling concerns. One group of data sets that are candidates for data pooling have been sent to Mark Vangel, chairman of the Statistics working group for analysis.

Preparation for the Fall Meeting has begun.

2. PROGRESS ADDRESSING IDENTIFIED CONCERNS

A task group established to address data pooling methodology, which is a barrier to getting data approved for inclusion in the handbook.

3. MANAGEMENT CHANGES

No management changes have taken place during this contract period.

| |
|------------------|
| Acquisition File |
| NTIS CRAC |
| DTIC TAB |
| Unannounced |
| Justification |
| By A278795 |
| Date |
| |
| |
| A-1 |

4. SCHEDULING CONCERNS

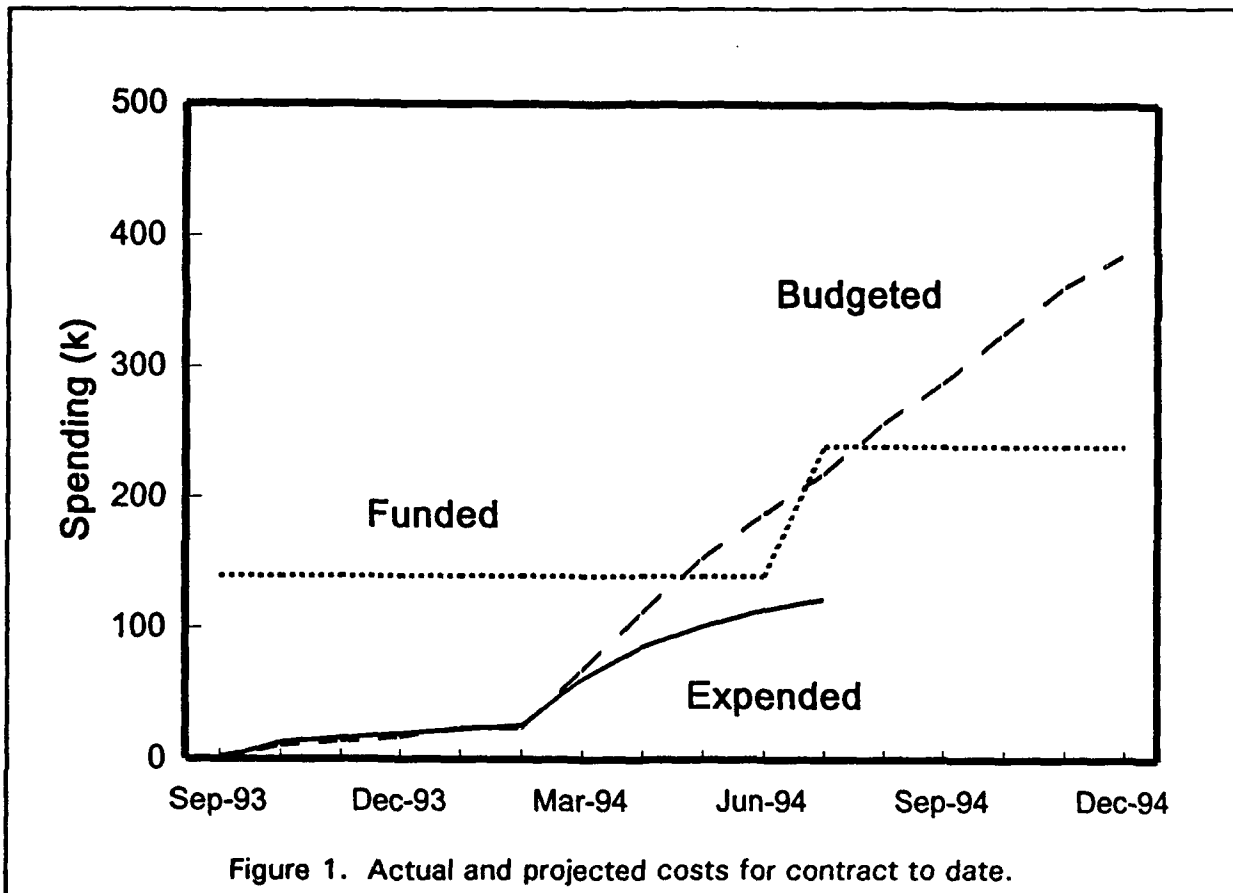
The most urgent of the scheduling concerns has been addressed by the Contract Modification 0003. Preparations for the Fall Meeting, data analysis, and the preparation of new and revised sections for inclusion in the handbook have been scheduled.

5. COST ELEMENT CONCERNS

The most urgent of the cost element concerns has been addressed by the Contract Modification 0003. Effort is now available to provide the usual level of support for the Fall Meeting and to handle data analysis prior to the meeting.

6. COST STATUS

The cost status from the contract start date through this reporting period is shown in Figure 1.



7. COST REPORT

The costs incurred during this reporting period and the total contractual expenditures as of 31 July 1994 are shown in the following table:

TABLE 1. Contract Cost Chart

| | Reporting Period Costs | Cumulative Costs |
|--------------------|---------------------------|------------------|
| Labor | \$8,373 | \$102,265 |
| Travel | \$0 | \$6,398 |
| Other Direct Costs | \$0 | \$486 |
| Subcontract | \$0 | \$0 |
| Other | \$0 | \$13,453 |
| Total | \$8,373 | \$122,602 |

8. LABOR

The person-hours incurred during this reporting period and the total contractual expenditures as of 31 July 1994 are shown in Table 2:

TABLE 2. Labor status.

| | Reporting Period | Cumulative |
|--------------|------------------|------------|
| Person-hours | 84 | 1,287 |

9. TRAVEL REPORT

No travel occurred during this reporting period.

10. SIGNIFICANT COMMUNICATIONS

a. Significant Letters

The following letters were mailed or received during this reporting period:

| MIL-HDBK-17 Project Letters (Sent) Log | | | |
|--|-----------|------|-------|
| Date | Addressee | File | Topic |
| no letters mailed this period | | | |

| MIL-HDBK-17 Project Letters (Received) Log | | | |
|--|--------------------|----------------------------|---|
| Date | Sender | File | Topic/Notes |
| 7/ 5/94 | Adams, Don | (Testing WG) | Comments on Glass Transition Temperature draft, dimensions on Figure 2? |
| 7/11/94 | Hart, Bernie | (Guidelines) | Copy of Michele Thomas' submission on dent depth for 3-11.1.2 |
| 7/12/94 | Bertelsen, William | (Thick-Section Composites) | Article and sample data on two-dimensional pressure test |

b. Significant Telephone Contacts

The following significant telephone contacts occurred during this reporting period:

| MIL-HDBK-17 Phone Log: | | |
|------------------------|------------------------|--|
| Date | Contact(s) | Topic/Notes |
| 7/ 6/94 | Dobyns, Al | Will send better copies and data for revision to buckling section, Sikorsky data is unpublished and should be removed as unreferenceable |
| 7/ 6/94 | Riskalla, Magdy | Submission of stress-strain curves - will start one condition per week today, will include average curve per specimen with ~ 100 points per curve |
| 7/ 7/94 | Shyprykevich, Peter | Interaction between Structural Joints working group and the Testing and Guidelines working group needs to be resolved including who has responsibility for Volume 1, Chapter 7, add to working group chairmen's meeting agenda |
| 7/ 8/94 | Miller, Ron (Rockwell) | Needs contact for material specifications on MIL-17: Margaret Roylance recommended |

MIL-HDBK-17 Phone Log:

| Date | Contact(s) | Topic/Notes |
|-------------|--|---|
| 7/ 8/94 | Soderquist, Joe | Interested in MSC reviewing MADMWG schema, particularly relative to MIL-17 |
| 7/18/94 | Wilcox, Karen | MIL-17 interest at NSWC, the question of government employees (NASA-Langley) getting reimbursed for the meeting registration fee was raised |
| 7/18/94 | Edwards, Bob (NSWC) | Interest in MIL-17, how to get copy, next mtg announcement |
| 7/19/94 | Soderquist, Joe | Pimm's review information to be included in handbook - closed on Guidelines agenda, CHN to fax comments from 12/93 and revision to Vol 3 Chap 4 submitted by Zvi Hashin |
| 7/19/94 | Soderquist, Joe | What needs to be done to complete revision by Lagace |
| 7/20/94 | Soderquist, Joe | Status of minimum requirements, LEGNEV and data pooling, Gary Hanson to submit data |
| 7/22/94 | Raju, Basava | Needs to receive announcement of meeting |
| 7/22/94 | Wilcox, Karen | Announcement to Basava Raju per request |
| 7/22/94 | Soderquist, Joe | Fields comments on handbook - allowables, material specifications |
| 7/27/94 | Clegg, Ed, Bamberg, Kathie, Hart, Bernie | Will send published version of Volumes 1 & 3, Kathy Bamberg will call tomorrow re: contract mod |
| 7/27/94 | Clegg, Ed | Questions re: contract modification, 30 day period for preparation of changes and revisions, yellow pages, what is in released handbook |
| 7/28/94 | Fields, Rich | Note changes in Chapter 2 which will impact revision |
| 7/28/94 | Pimm, John | First two figures in 3-6.5 are originals, CHN to check with Han-Pin Kan on source of IPACS figure |
| 7/28/94 | Reeve, Scott | Figure in 3-3.2.6 is original, CHN to send data pooling package, after 8/13 ok for task group meeting |

MIL-HDBK-17 Phone Log:

| Date | Contact(s) | Topic/Notes |
|---------|-------------------|--|
| 7/28/94 | Sanger, Ken | Summary for 3-4.6 is a reformat and replacement for Ilcewicz's rules of thumb section |
| 7/28/94 | Bamberg, Kathie | ARL wants to be sure that they have all releases, revision or change notices, on diskette |
| 7/28/94 | Hagnauer, Gary | Review of intersociety forum, change in standardization function - concentrate in four areas, one of which is composites, loss of 94 money (absorbed into ARL general funds), CHN to chair Forum mtg, agenda planned, addressees reviewed, GH to send addresses, no info on Persh's stdn session at Cocoa Beach, Harvey Berkowitz to co-chair MMC coordination group |
| 7/29/94 | Camponeschi, Gene | Will send hard copy of compression tests figures |
| 7/29/94 | Fields, Rich | CHN to email formats for graphics files, Rich to send shear test section figures by 8/15 |
| 7/29/94 | Soderquist, Joe | CHN to fax forum letter, CHN to contact Doug Ward re:MOL section, JS complete review of Field's comments, Lagace section to be resolved by meeting, go in submission to ARL |
| 7/29/94 | Vangel, Mark | Can meet with data pooling task group last two weeks of August, review list of data, send IM6/3501-6 data |

c. Significant Electronic Mail Contacts

The following electronic mail was received or sent during this reporting period:

MIL-HDBK-17 Project E-Mail (Sent) Log

| Date | Addressee(s) | File | Topic/Notes |
|---------|--------------|------|----------------------------|
| 7/11/94 | Long, Mike | | Data received, format fine |

| MIL-HDBK-17 Project E-Mail (Received) Log | | | |
|---|-----------------|-------------|--|
| Date | Sender(s) | File | Topic/Notes |
| 7/11/94 | Shuely, Wendell | | Is there an email directory for MIL-HDBK-17? |
| 7/11/94 | Long, Mike | V940711.IML | Vought fabric RTD stress-strain data |

d. Significant Facsimile Contacts

The following facsimile mail was received or sent during this reporting period:

| MIL-HDBK-17 Project FAX's (Sent) Log | | |
|--------------------------------------|-----------------|---|
| Date | Addressee(s) | Topic/Notes |
| 7/ 5/94 | Vangel, Mark | List of candidate data for pooling |
| 7/18/94 | Wilcox, Karen | NSWC interest addresses |
| 7/18/94 | Edwards, Bob | Information on DODSSP |
| 7/19/94 | Soderquist, Joe | Zvi Hashin's proposed revision to Vol 3, Section 4.2.2.1 and my comments on June 93 proceedings |
| 7/26/94 | Hagnauer, Gary | Intersociety Forum letter and merge |

11. ENGINEERING CHANGE PROPOSAL STATUS

No engineering change proposals are outstanding at this time.

12. CONTRACT SCHEDULE STATUS

The additional dates for submissions based on Contract Modification 0003 have been added to the schedule. No other changes to the schedule were made during this contract period.

13. ACTIVITIES PLAN

The following activities are planned for the next reporting period:

- a. Preparation for the Fall Meeting
- b. Data analysis
- c. Addressing data pooling concerns

14. PREPARER

This report was prepared by Crystal H. Newton, Project Engineer.

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|------------------|-----------------|
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